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ABSTRACT

This report presents results of a study of five state and local computer-based special education management information systems (MISs). Descriptions are provided of the five MISs used for reporting and decision-making in special education, the planning and implementation processes used by the states and districts, and the general benefits that have been observed. A cross-site comparative analysis considers benefits in the areas of state education agency (SEA) desk audits, more accurate reporting, ad hoc reporting, special reports to local education agencies (LEAs), and individual education planning. The following planning and implementation variables are also compared for the five states: state financial incentives; state priority/mandate for MIS; SEA involvement of stakeholders in MIS planning, design, and implementation; involvement of special education and MIS specialists in joint design and pilot testing of the systems; and LEA implementation variables, including quality control over data entry. Steps that must be undertaken by state education agency officials for successful MIS implementation are outlined, and implications for state and local policymakers are addressed in depth using a question-and-answer format. (SW)

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CASE STUDIES
OF
STATE-WIDE SPECIAL EDUCATION
MANAGEMENT SYSTEMS

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INTRODUCTION

Although many states and school districts have the need for more effective special education administrative and management systems, only a few have successfully developed and implemented such systems. States wishing to develop state-wide networks could benefit by knowing the necessary conditions and resource requirements for successful system design and implementation. In an effort to address this need, Education TURNKEY Systems, Inc. (TURNKEY) has conducted this study of state-wide, computer-based special education management information systems (MISs).

The principal objectives of the study were to:

- identify, describe, and analyze local and state-level implementation variables which contributed to success; and
- describe and assess implementation patterns and processes that are common across sites to assist state and local decision makers in planning state-wide management systems for special education.

The study sample consists of management information systems in five states selected to reflect important differences in: (a) their approaches to MIS development; (b) their stages of development; (c) the states' degrees of centralization; and (d) their extent of system implementation.

Within each state, we gathered data from at least two local education agencies (LEAs) and/or intermediate education units (IEUs) that are using their state MIS. These district-level contacts are intended to determine the degree of local involvement in MIS design and implementation, as well as to obtain perceptions about how well the MISs are addressing local needs.

This reports consists of four principal sections:

1. a brief Executive Summary intended to be used as a means of disseminating information about the study;
2. summary descriptions of the state-wide MISs in each state;
3. a comparative analysis of the state-wide systems; and

4. a discussion of the study's implications for state and local policy makers and planners.

I. EXECUTIVE SUMMARY

This case study of state and local special education management information systems was designed to identify implementation variables and processes that can contribute to system success. Among the most important findings of the study are: (a) the benefits accruing to states that successfully implement effective management systems; (b) planning and implementation variables which appear to correlate with successful system deployment; and (c) implications of the study for state and local policy makers.

At the heart of the benefits of well-implemented state-wide special education management information systems (MISs) is the more effective and efficient use of information. At the state level, these MISs yielded more accurate and timely data, as well as reductions in LEA staff time for preparing data and SEA staff time for verifying it. At the heart of the benefits accruing to states from effective MIS implementation is an increased capacity for reporting. Using state MISs, SEAs have been able to respond more promptly and accurately to information requests from legislators, state board members, other state agencies, and local school districts. At the local level, the most important benefits emerged from the systems' IEP components; in particular, the MIS allowed for:

- reduced teacher time on routine record-keeping activities;
- more focused discussions with parents;
- improved student tracking for transfers and children served by multiple agencies; and
- more responsive monitoring of student goals, objectives, skills, and evaluation strategies leading to more appropriate placements.

Across all states, there were a number of planning and implementation variables that appear to be associated with successful state-wide MISs. At the state level, perhaps the most important factor is a clear state mandate establishing administrative and financial support for the system. This mandate is accompanied by careful attention to the needs of the various stakeholders in the enterprise, including SEA officials, other state agencies (where appropriate), legislators, local education agencies, and intermediate

units. States that successfully implemented their MISs also provided important financial incentives to LEAs for their participation in the system. These incentives took the form of grants or technical support for the development of LEA software components, as well as specific payments for errorless student reporting. Another critical factor in successful MIS implementation is the leadership and cooperation of key officials, at least one of whom must have in-depth special education knowledge and another who must have strong relevant software development expertise. Two factors at the local level also appear to correlate with success in MIS implementation. The first is effective communication between LEA special education staff and the LEA's MIS or data processing office. The second important factor is a strong emphasis on quality control over data entry, including a variety of manual and automated checking mechanisms.

These case studies have demonstrated that a number of clearly defined steps must be undertaken by SEA officials for successful MIS implementation:

- a. establishment of a mandate to implement an MIS -- either legislatively or departmentally;
- b. identification of stakeholders who should be involved in the MIS planning, designing, and implementation processes;
- c. establishing consensus on definitional issues from stakeholders;
- d. development of a plan with stakeholders;
- e. development of the management information system itself;
- f. pilot testing of the MIS;
- g. training of state and local users in the MIS; and
- h. provision of resources/support to local districts for full state-wide (district-wide) implementation.

II. SUMMARY DESCRIPTIONS OF MODEL STATE-WIDE MISs IN SPECIAL EDUCATION

In this section we describe five model state and local management information systems (MISs) currently used for reporting and decision making in special education, the planning and implementation processes used by the states and districts, and the general benefits which have been observed.

A. STATE A

Having evolved over the last two decades, the MIS used in State A is one of the most exemplary MISs used throughout the country.

1. DESCRIPTION

The state's MIS is currently being used by all districts in the state. Approximately three-fourths of the districts submit data on disc or tape to the SEA for processing; the remainder of the districts provide data in hard copy on state reporting forms. Approximately 90,000 student records are currently maintained on the MIS. About half of the LEAs use the MIS software on mainframe equipment for generating data and reports for the state, while the other half use a variety of software programs on microcomputers to meet state reporting requirements. Approximately three-fourths of the districts use the state MIS program and data bases for local reporting and decision making.

The state has used a Hewlett-Packard 3000 since the early 1980s for state-level processing and report generation for Federal agencies and local districts. During the mid 1980s, a relational data base program was acquired for use at the state level.

Since the early 1980s, the state MIS has been housed in the SEA Office of Special Education with a full-time director, clerk, and several support staff.

The state MIS has been designed to compile and report information on the number of handicapped children in the state, their special education needs, and the services they receive. The MIS is the major source of information used by the SEA to monitor delivery of services in each of the local school systems and state-operated programs. It is also used to satisfy Federal reporting requirements under P.L. 94-142, Titles VI and XIX of the Civil Rights Act as they apply to special education, and Section 504 of the Rehabilitation Act of 1973. In addition to the SEA, other state agencies responsible for purchase-of-care and related services (i.e., Mental Health and Hygiene, the Governor's Office on Children and Youth, Human Resources, Corrections) also use the state MIS data base for administrative and monitoring purposes. The system can also be used by advocacy and parent/consumer groups in planning and supporting the expansion of special education services. In addition, graduate students and researchers may also use data from the MIS to conduct studies of the delivery of services.

Some of the unique features/capabilities of the state MIS include:

- use of a coded number for identifying handicapped students to ensure confidentiality;
- identification of students with limited English proficiency;
- county of residence, as well as school location, to ensure appropriate funding accountability for state-operated programs and purchase of care;
- twelve handicapping conditions, as reflected in the state law;
- services (both direct and indirect) recommended by assessment/review/dismissal committees and the environment in which such services are to be provided;
- a detailed reporting on the nature of services recommended, including anticipated services, particularly for transition students; and
- actual services being provided and their frequency.

While the SEA in the past had provided special reports to districts upon request, in the mid-1980s it adopted a policy of providing only three reports to LEAs: the December 1 child count report; the end-of-year performance report; and an annual report for use in developing OCR reports by individual districts, where appropriate.

2. IMPLEMENTATION OF MIS

Below, the design and implementation activities leading to state MIS are highlighted.

a. Phase 1: Needs Assessment (1971-76)

- A formal needs assessment was conducted, identifying the need for greater accuracy in projections and reduced duplication of information collection by other state agencies.
- Attempts were made to establish a climate of cooperation among state agencies and agree on definitions and data to be collected.
- A governance committee, involving six agencies, was created to identify duplication of services and refine funds allocation procedures.
- A computer design for MIS was developed.
- A presentation of the MIS design was made to more than 140 separate state and local agencies.
- Attempts were made to implement data collection using MIS; reported data were highly inaccurate.
- Agencies conducted verification audits and shared costs for data processing for the first time.
- Pilot-testing was conducted, in one county, for a service-oriented data system as an alternative new state data reporting system.

Despite extensive planning to ensure interagency coordination and cooperation for data collection, reporting, and verification, the first attempt to gather data resulted in gross inaccuracies. While some of the problems could be attributed to different definitions and technical problems, major interagency differences regarding funding, particularly for related services proliferated. Other fundamental problems included: (1) disincentives on the part of local districts to report unduplicated counts as such reporting would result in lower funding for the district; (2) lack of MIS credibility on the part of those districts reporting accurate information as the state board requested similar information on an ad hoc basis; and (3) hesitancy on the part of districts to report children identified but not being served, because of the unavailability of appropriate services. In addition, the data system was perceived by many as requiring diagnostic labeling.

As a result, a decision was made to revamp totally the existing data system, change its name, finalize the design, and implement a new service-oriented data system tested in a local county. The field-test of this system found that the alternative was more realistic in describing the service needs of children, more useful in preparing plans and budgets for local school districts, and generally more acceptable than traditional diagnostic models in guarding the privacy of children while still providing the needed information.

b. Phase 2 - Redirection (1976-80)

- The SEA contracts with an independent consulting firm to study current use and local attitudes toward the MIS; the study concluded that the MIS would be viable if the SEA placed a high priority on ensuring its credibility; if LEAs see a definite utility of the state MIS in generating reports for them.
- A task force is established to develop procedures for formalizing a users' need checkoff.
- An office of state MIS is created under the SEA's Assistant Superintendent for Special Education and staff is hired.
- Equipment previously used for computer processing is physically moved to the newly created MIS office.
- All special education information processing responsibilities are delegated to the state MIS office with a moratorium on ad hoc information gathering by other groups within the SEA.
- State MIS staff begin to work with local districts in generating custom reports in response to requests.
- A policy decision is made to use SEA definitions rather than attempt to collect information uniformly for other state agencies which might use state MIS data.

c. Phase 3 - 1980 to Present

- SEA MIS staff expand technical assistance to LEAs to demonstrate how state MIS data could be used by local administrative personnel to improve decision making, planning, and forecasting.
- SEA MIS staff assist LEAs in the development of software to interface with the MIS under the assumption that LEAs would enter data more accurately if they would use MIS data for local planning and decision-making purposes.

- The Governor creates a coordinating group for all agencies providing direct or related services to handicapped students; the coordinating group agrees to use state MIS data as information source for determining who pays for what services.
- SEA MIS staff identify and purchase a relational data base software program which reduces the time and cost of file searches (which were sequential in the older program).
- The SEA encourages LEAs to transmit state MIS data electronically or on tape.
- The SEA decides to provide only three reports to LEAs, thereby reducing the need for LEAs to submit periodic updates and the SEA agrees to use state MIS data bases for producing all SEA internal reports, thereby minimizing ad hoc data collection efforts.

3. RECENT BENEFITS OF STATE MIS

The benefits to the SEA of the state MIS, particularly the upgraded version using the relational data base program, have been significant, especially when compared to the system used over a decade ago. Some of these recent benefits include:

- the ability to respond almost immediately to information requests from legislators and state board members on sensitive issues (e.g., least restrictive environment, specific programs across the state);
- the capability of conducting desk audits using probability theory as a means of finding errors or inaccuracies and identifying potential problems in specific district programs;
- because of the natural language query capabilities of the MIS, the SEA has replaced a technical programmer with a policy analyst staff position; and
- the SEA decision to submit three reports annually to LEAs reduced staff time on the part of local districts to update records and transmit such updates to the SEA.

B. STATE B

1. DESCRIPTION

The management information system used in this state for special education management and reporting was developed in the late 1970s and, by the

mid-1980s, was implemented in approximately 80 percent of the LEAs within the state. Currently, the state is integrating the special education reporting system into a more comprehensive student and personnel MIS, covering all regular and categorical programs. The state special education MIS is different from most other MISs addressed in this study in that the MIS also includes an optional IEP management and reporting component.

The state MIS was designed initially to be used for batch mode processing, relying on several mainframe computers located in multi-regional processing centers within the state; it now allows for on-line access.

The state MIS program maintains individual data for students receiving special education services. The system allows districts to access any of the more than 100 data elements maintained for each student and to combine information in a variety of ways to serve the following functions:

- providing districts with accurate information on which to base management decisions;
- assisting districts in internal monitoring and by documenting compliance with P.L. 94-142 and the state's policies and administrative procedures for the education of handicapped students;
- automatically generating many of the reports required by state and Federal agencies; and
- providing a tracking system for special education students who transfer from one school district to another.

The system has the capability of developing, at a minimum, the following reports:

- Student Numeric List by District;
- Student Alpha List by District;
- Stand-Alone Profile Report;
- Stand-Alone Edit Report;
- Evaluation Notice of Last Comprehensive Assessment;
- Evaluation Notice of Last Annual Review;
- Duplicate Student ID List by Program;
- Duplicate Alphabetic Student by Program;
- Student List by Primary Handicap by District;
- Student List by Primary Handicap by Co-Op;
- Student Alpha List by Region;
- Student Alpha List by Co-Op;
- Student Alpha List by Campus;

- Student Numeric List by Region;
- Student Numeric List by Co-Op;
- Student Numeric List by Campus;
- List of P.L. 89-313 Students by District;
- P.L. 89-313 Student Exception List;
- P.L. 94-142 Student Exception List;
- A.S.E.S.R. Student Student Exception List;
- Civil Rights Survey Exception List;
- P.L. 89-313 State Report;
- P.L. 94-142 State Report; and
- Civil Rights Survey - Federal Report.

Many districts have used the state's MIS to develop other customized reports as well, including:

- lists of handicapped students enrolled in special education by primary and secondary handicap;
- student information profiles with information on dominant language, ARD date, IEP date, current status, funding, and related services; and
- a student listing by instructional arrangement and daily contact hours which is being used for reporting to the SEA to generate FTE funding.

At the district and building level, the state MIS has the capability of developing several reports relating to the IEP, including one which includes goals, objectives, and status. Many districts have supplemented state MIS software with additional programs that allow MIS data to be used for projecting enrollments and staff needs, program planning, budgeting, diagnosing students, replacement, test scoring and analysis, and general communications with parents through word processing capabilities.

2. IMPLEMENTATION STEPS AND ACTIVITIES

Below we highlight the major planning and implementation activities of the state's MIS.

a. Phase 1 - Design and Pilot Testing (1975-82)

A number of design features and implementation steps were important during the early years.

- After passage of P.L. 94-142, a planning group within the SEA presented arguments for a data base reporting system which would focus on

individual students and was in tune with the philosophy of developing individualized education plans.

- Given the prevalence of local autonomy, the SEA felt that a reporting system would have to be sold to regional and district agencies on the basis of reducing staff time and effort in generating state and Federally-required reports and that such a system could also be used for management purposes at the district level.
- The state delegated primary responsibility for data processing to multi-regional processing centers within the state, thereby minimizing the need for state-level processing.
- The state provided financial incentives to regional offices for accurate reporting -- ranging from \$1.25 to \$1.50 for each accurate student report.
- The actual software program was designed and developed by a person who was extremely knowledgeable about special education and administrative processing and an experienced software developer who was very knowledgeable about current data processing capabilities in the state.
- Processing occurred in three multi-regional processing centers who considered the state MIS to be a source of revenue generation for them as they provided data processing services under contract to the state agency and districts.
- Participating multi-regional processing center staffs developed a users guide and customized it for districts in their regions.

At the end of this initial phase, the multi-regional processing centers were taking a leadership role, working directly with districts and cooperatives who "volunteered" to use the state MIS program.

b. Phase 2 - State Agency Disengagement (1982-88)

- The state agency had to disengage itself from the implementation of the MIS as the legislature reduced required state reporting as part of grants consolidation and cut the state agency budget which could have been used to provide technical assistance to multi-regional processing centers and LEAs.
- As a result of the state agency's disengagement, the multi-regional processing centers, in a very real sense, took over the state MIS program, including the processing of data and generation of Federal reports for the state agency.
- In 1988, at the request of the legislature, the state agency developed a design for a comprehensive MIS into which much of the state MIS data and reporting would be integrated.

3. BENEFITS ACHIEVED

A number of benefits accrued to both state and local programs. At the state level, the following benefits have been observed.

- By the mid-1980s, almost 80 percent of all LEAs reported their data accurately and in a uniform format to the state or indirectly to the state through the multi-regional processing centers.
- State agency monitoring staff were able to reduce on-site monitoring time by conducting desk audits prior to on-site field audits.

At the district level, a number of benefits have been attributed to the use of the state MIS, including:

- the ability of the districts to increase the total amount of state funding allocated by the state due to more accurate reporting, especially on contact time and services provided to high-cost students;
- the capability of generating locally-developed reports from the state MIS data base, which has saved enormous amounts of staff time as they monitor the status of individual students and the processing steps in which they are involved;
- reduced teacher time in providing monthly and other reports to supervisors; and
- reductions in staff time at ARD meetings by at least 50 percent.

In districts using the IEP component, a number of additional benefits have been experienced, including:

- the reduction of paper work during IEP meetings, thereby providing teachers greater opportunities to talk directly with parents;
- improved staff planning for IEP meetings and communications in notifying staff and parents about scheduled meetings;
- increased accuracy of information in IEPs and student folders;
- increased coordination between special education teachers and regular and Chapter 1 teachers;
- improved monitoring of student progress on the part of teachers and parents;
- greater uniformity in reporting on individual students, which accommodates transfer of students from one campus to another or from one district to another; and

- increased teacher and counselor contact time with students (approximately 25 percent) by reducing paper work and routinized activities.

C. STATE C

1. DESCRIPTION

Planning for the comprehensive state management information system began in the late 1970s. In the mid-1980s, the state began to merge special education reporting into the overall state MIS, operating on a state-wide computer network which links all school districts and community colleges. This network connects terminal equipment and computer facilities and provides low-cost dial-up and asynchronous communications. The network software, which has been in place since the early 1980s, allows districts to use existing equipment rather than forcing them to purchase hardware which is compatible only with a particular network environment.

The network provides a variety of applications accessible through the network, including:

- automated submission of quarterly FTE data to the SEA for determining funding allocations;
- access to software and services for student record processing, including attendance, scheduling, and grade reporting;
- electronic mail and bulletin boards for disseminating news items, memoranda, and bulletins from the SEA; and
- access to a data base of microcomputer instructional software and evaluations.

At the local level, the MIS is capable of providing approximately 300 reports on special education students and programs. Some of the more important reports include:

- critical dates for individual students, including referral, evaluation, staffing, IEP, and dismissal, among others;
- student listings by handicapping condition for state reporting;

- grade distribution by student and subject area;
- health and related services;
- rosters and lists by school program;
- student placement and dismissal from special education; and
- special program verification.

The systems software, which allows file transfers to the SEA via the network, was designed specifically to facilitate the implementation of the state MIS to accommodate the data element directory, which is maintained and updated by the SEA.

2. DEVELOPMENT AND IMPLEMENTATION

Below we highlight the critical implementation steps taken during the development of the state MIS and the merging of special education reporting into the comprehensive state MIS.

a. Phase 1 - Legislative Mandate (1978-83)

- In the late 1970s, the SEA conducted a survey of schools to determine the number of special education students and found that the reported number was approximately twice the estimates used by the legislature for funding. Inaccuracies were attributed to varying definitions of special education students.
- The state Senate president directed the SEA to create an MIS to ensure uniform and accurate reporting.
- Organized teacher associations lobbied the legislature to have districts reduce the amount of paper work and reporting conducted at the local level.
- The SEA created an MIS council (including representatives from local districts and universities) to design critical MIS components, including a data element dictionary, system software that would allow existing district hardware to have a compatible file transfer capability, and reviews of data collection forms to minimize duplication.
- In the early 1980s, the SEA began to implement the state MIS after several districts' law suits to enjoin MIS implementation were dismissed by state courts.
- The legislature reinforced its mandate that districts comply with the state-wide MIS handbook and delegated authority to the SEA to change

definitions in the handbook without having to obtain legislative approval.

b. Phase 2 - Merge Special Education into State MIS (1984-Present)

- The state MIS office assigned a key staff member to provide liaison with the Office of Special Education to plan the inclusion of special education information into the state MIS.
- The stated objectives were to reduce the number of individuals who would input data (thereby reducing errors while saving staff time) and to increase the accuracy of reporting for Federal and state funding purposes; an implicit objective was to provide opportunities for the SEA to conduct desk audits, reducing on-site staff monitoring time.
- The SEA developed special education definitions and terminology corresponding to specific data fields in the MIS and field-tested the definitions in approximately 20 county systems; the initial terminology was too open to interpretation between special education staff and local MIS staff and had to be made more rigorous and definitive.
- The state provided a procedural safeguards software package, listing all required Federal mandates related to processing and child count; districts were able to add their own applications.
- A conscious decision was made by the SEA not to have the software package assist in developing, preparing, or managing the IEP process.
- The SEA initiated a pilot implementation of the merged special education component within the state MIS in 1989.

3. ANTICIPATED BENEFITS

The integration of special education reporting through the state MIS is currently underway in the pilot districts. Several anticipated benefits at the state level include:

- increased accuracy of child count reporting and other information on which FTE funding is based;
- reduction in data entry time and errors, as data will be entered only one time;
- increased opportunities to provide special reports comparing district programs on important issues (e.g., least restrictive environment);
- the ability to conduct desk audits prior to on-site monitoring visits, thus reducing overall staff monitoring time; and

- an opportunity to conduct comprehensive analyses of programs for program improvement purposes.

Benefits which have accrued to the MIS at the local level at some of the pilot sites include:

- a reduction in staff time by 25 percent in the number of hours required to conduct the annual child counts and child count updates (three time per year);
- improved capacity for local decision makers in projecting annual teacher needs, student enrollment and scheduling, budgets, and resources based on FTE and local funding; and
- an ability to generate up to 300 reports used for local decision-making purposes.

The two local districts in this state included in the study were experimenting with and/or pilot-testing IEP programs which were not, however, designed to build upon or otherwise be part of the state MIS. While one or more staff in each of the districts felt that automated IEPs could be extremely useful to teachers and other staff, virtually all staff were cautious about expanded use for several reasons: (a) their perception that the SEA discouraged automated IEP development; (b) concerns that advocates and/or parents would react negatively to predeveloped IEPs being taken to meetings with their children and might threaten law suits; and (C) the lack of stability in the SEA's curriculum framework, except for the severely handicapped.

As a result of the pilot testing, a number of benefits have been attributed to automated IEPs, as highlighted below.

- After initial testing, existing manually-operated procedures were found to be inconsistent and inadequate; hence, a major effort was undertaken in one district to more clearly delineate responsibility for such areas as parent notification, teacher notification of staffing meetings, management of paper IEPs, and other functions prior to the development of automated procedures.
- A capacity for teachers to add goals and objectives very quickly to the automated coding structure occurred.
- A savings of staff and parent time occurred by using draft IEPs for review with parents, thus allowing the teacher to take a more active role in consulting with the parent regarding the IEP.

- Opportunities were provided for teachers not able to attend IEP meetings to provide input into IEPs.

D. STATE D

1. DESCRIPTION

Unlike other model state management information systems included in this study, the State D MIS has only recently been developed and is in the process of being piloted tested and implemented. The already available components are being used in approximately half of the planning co-ops in the state.

The purpose of the MIS is to provide a decision support system for directors of special education, including:

- report functions (e.g., reporting data for state and Federal funding and information analysis);
- structured decision making, including planning and forecasting; and
- semi-structure decision making (i.e., ad hoc analysis, short term decisions).

The components provided thus far allow for maintenance of student data, generation of class lists, assignment of psychologists' case loads, analysis of referral data, teacher and staff salary information, development of proposals, and preparation of information for school board meetings.

Data are entered into the system through the use of menu-driven input screens; editing functions are built into the software, making it possible to enter or change data directly from referral forms or from the student data base. Information is extracted through the use of queries, predesigned report formats, or custom designed reporting formats. The system also has an electronic bulletin board capability which allows computer conferencing and down-loading software to co-ops involved in field-testing.

The current system has been designed for use on both UNISYS and IBM (or other MS-DOS-compatible equipment). The relational data base used is dBase III+. A mainframe computer is being acquired for centralized data processing.

Hardware at pilot test and user sites are a combination of UNISYS equipment and MD-DOS-compatible hardware, including Wang. Users are required to furnish their own hardware and to purchase dBase III+ in addition to ProCOM software, if they plan to access the electronic bulletin board via modem. The MIS software is provided by the SEA. A hard disk drive with at least 10mb of memory is required to operate the program.

2. DEVELOPMENT/IMPLEMENTATION

- The need for the MIS was engendered by state and Federal reporting requirements under P.L. 94-142, as buttressed by P.L. 99-199; however, the SEA believed that uniform implementation would not occur unless the system also met the information and decision-making needs of local special education directors and program managers.
- Commercially-available systems were examined; because they failed to meet unique reporting needs at the local level, a decision to develop a customized program was made.
- The SEA contracted with a state university for the development, field-testing, and training.
- The MIS design was developed with three co-op sites who jointly developed the data dictionary.
- After initial debugging at three sites, training programs were developed and the system was implemented in six additional sites.
- All existing components and planned programs (e.g., an artificial intelligence system to advise on interventions, an individualized education program planner) are being developed in consultation with individual staff at planning co-op sites.

3. ACTUAL AND PERCEIVED BENEFITS OF MIS

- Staff time previously required to verify and audit the accuracy of reports has been reduced significantly; under the manual system, eight person-days of state staff time plus two to four hours of staff time from each local district were required to conduct audits and verification of the December 1 counts. Under the new system, this meeting time has been eliminated.
- Reports submitted by local districts are more accurate and are submitted in a more timely manner with closer adherence to report deadlines.
- Inaccuracies in local data are easier to identify earlier in the reporting process.
- Reports can be prepared in less time.

- Staff involved in data collection and reporting are beginning to appreciate the value of accurate data and how it can be used as an aid in local decision making.

E. STATE E

1. DESCRIPTION

The current hardware configuration at the state level includes a mainframe that can accept data in any magnetic format from the districts -- discs (PC-based) or electronic data via modem. For districts that have not yet acquired hardware, modem, software, etc., the state keys in data manually from printed forms. This type of support will continue for only one more year. By 1991, all districts and cooperatives will be required to submit data accurately and electronically. The state then will no longer accept written reports in response to Federal reporting requirements. However, the goal of all districts submitting data electronically was achieved almost a year ahead of schedule. As of January 1990, all districts and cooperatives are submitting special education data electronically.

Although MS-DOS computers are the most prevalent, the state is recommending that districts new to the effort purchase the Apple Macintosh because of its ease-of-use features. There are two software packages used to down-load data to the state -- one for the Macintosh (Filemaker II) and the other (Q & A) for MS-DOS microcomputers.

2. IMPLEMENTATION STEPS AND ACTIVITIES

The current management information system initiative began in the late 1970s in response to demands of an administration hostile to special education. The major issue was "How do you (the State Department of Special Education) know that all of the money we are spending on special education is working?".

a. Initiation

The state-wide MIS began as a tool for program evaluation. Conceptualizing the elements and designing the implementation of the MIS was a very slow process. Initially the idea of a cross-agency data base that could provide information for Health and Human Service inquiries as well as Special Education was appealing; however, definitional requirements for specific data elements became an almost overwhelming challenge. Although this remains a goal for some future point in time, the State Department of Special Education is concentrating on achieving the MIS for the more narrow focus of its own mission.

The strategy of narrowing the focus of the data base, rather than trying to make it fit the needs of different agencies with a variety of agendas, helped move the MIS into the implementation phase. Rather than struggling with definitional requirements across Health and Human Services, Social Security, and Medicaid, the Special Education Department focused on what elements were necessary to answer its Federal reporting requirements and to provide essential special education data for the state. The consensus was to provide an MIS that met state special education needs and then, when the Special Education MIS was operational and working well, to expand (at some point in the future) to include other agencies' data requirements. At least a "model" for designing and implementing the state-wide MIS would be in existence.

b. Financial Support

Initial support for acquiring MIS hardware and software came from Part B discretionary funding. Districts were encouraged to design and develop a system that would meet their own needs as well as those of the state. This strategy has been in effect for several years; however, by 1990 there will no longer be special state funding to support the state-wide MIS initiative at the district level.

During the start-up period several consultants advised the staff at the state department. There were several "false starts", and with each change of consultant, the desire to rebuild the system from the ground up was prevalent.

Simultaneously with state department initiatives, a Special Education Director in one of the western cooperatives had received Part B state discretionary

funds to design a computerized IEP system for the local school districts in the cooperative. It appeared that, with some modifications, this automated IEP format could provide the data required of the state MIS. In order to assist in modifying the computerized IEP, a systems analyst was retained by the SEA.

A major hurdle was achieving agreement for the standard definitions of the 99 data elements required by the state MIS. It was difficult to obtain concurrence across the different professional groups providing IEP data.

The Networking IEP was developed under a Part B state grant. The systems analyst, hired by the district, programmed the major components of the system. Success is attributed to the division of the project into technical (represented by the systems analyst) and the educational (represented by the Special Education Director and his staff). The systems analyst has the unique capability to conceptualize, in a systematic way, the specific data requirements of special educators who complete the IEP. The systems analyst took the original IEP as a single point of entry and added additional demographics that were required by the state (the 99 data elements). The classroom teachers were to use modems and a bulletin board system to create an electronic special education community. It was essential to have teachers perceive the usefulness of the computerized process and to have the need to use it. This was especially important for special educators in the isolated rural areas of this western cooperative.

c. Incentives

The Networking IEP, when used by a local district or cooperative, generates the state-required data file. Additionally, it provides the local director with a file that lists three-year evaluations by student. To assist special educators, an objectives bank is also available.

The Networking IEP provides data on a school/teacher level. This information is forwarded (via disc) to the central office at the school district where it is aggregated with data from other schools in the district or cooperative. Then the district uses Q & A or Filemaker II to transfer the data to the state computer system.

The Central Office in the district may input data from manual forms to the Networking IEP or, for some very small districts, the state will input data from manual forms. This latter procedure was designed as a temporary means to be phased out entirely.

3. BENEFITS

The major benefits that accrue to the State Department of Special Education are that Federal reports can be generated in a timely manner with an improved level of accuracy.

At the state level, staff are able to use the existing data base to respond to ad hoc inquiries from state legislators. Rapid response to such inquiries assists in the budgeting process by justifying funding levels for special education and related services. This can be considered as having a direct impact upon the nature and level of services provided to students with handicaps.

A major long-term benefit to the local school district special education administrator should be the ability to access data for use in making more informed decisions. In the short-term, districts are alleviated of generating tedious Federally-required reports. The state generates these reports for the districts based on receipt of the 99 data elements for each student with a handicap(s).

The Networking IEP requires each domain of the child's development to be consciously considered before the next can be brought up on the screen. This process forces members of the IEP team to look across all domains for an individual child in determining the optimum placement and objectives for the student. The result of this should be improved accuracy of identification of services required for students with handicaps. The documentation available, because of the computerized process, enhances the ability to respond to monitoring inquiries from the state department or the Federal government.

For the State Department of Special Education, the computerized process provides a state-wide student data base that supports ad hoc inquiries from

the state legislature or other sources. A key goal is to provide better (more accurate and current) data for management decision making.

Additionally, review of the district student data base provides advantages to the monitoring team. Availability of the data increases the ability of the team to identify potential out-of-compliance areas and makes time spent on site more effective.

Officials at the state department indicate that the computerized student data base -- which currently includes data for determining funding on unit reimbursement, where the unit is the licensed professional service provider (special educator, occupational therapist, physical therapist, speech therapist, adaptive physical educator, etc.) -- will change the way they deliver services. The case load and class size will be affected and an alternative service delivery model will arise. A model based upon what the student needs and the amount of service the student receives will perhaps cause a shift to identifying the student as the unit for funding. In such a case, the Networking IEP with its bank of objectives would fit nicely into the "new" model.

4. DISINCENTIVES

Teachers, who are primarily responsible for generating the IEP upon which the state data base relies for its 99 data points, perceive the Networking IEP as more paper work. Actually, the software is fairly well error-trapped so the accuracy of the information compiled during the IEP process is automatically checked.

People problems provide the greatest disincentive. There needs to be someone or something to blame. For example, "the computer is down" or "I cannot get the software to work", so the IEP meeting is not convened.

III. CROSS-SITE COMPARATIVE ANALYSIS

In this section we highlight the results of our cross-site analysis of exemplary state-local management information systems (MISs), including some which have IEP components. We first address common benefits across sites, for both state and local levels. We then identify planning and implementation variables associated with these exemplary systems. Where possible, we attempt to separate state-level implementation variables from those observed uniquely at the local level, all of which have contributed to overall success.

A. BENEFITS

A number of benefits have been attributed to the MISs currently implemented within the study states. Based on limited pilot testing in some states, it can be expected that some of the benefits will be more widespread in the future.

1. SEA DESK AUDITS

All SEAs perceived savings in SEA staff time, normally spent in on-site monitoring, through the use of MIS data for desk audits in preparation for site visits. Moreover, some states believe that the MIS data: (a) assisted them in identifying specific administrative procedures by which they could verify potential audit exceptions and communicate such potential exceptions to the sites prior to the visit; (b) identified patterns across similarly situated districts which justified the preparation of program improvement guidelines, documents, or assistance to the sites; and (c) reduced SEA staff time in verifying Federally-required data.

2. MORE ACCURATE REPORTING

All states observed substantial increases in: (a) the accuracy of data reporting required by state and Federal law; (b) the timeliness of data or report generation between the LEA and SEA; and (c) savings in staff time, at the local level, in verifying data. In one state, the need for a state-sponsored meeting of all school districts for the purpose of verifying

data in the December child count report was eliminated, saving at least one day of staff time per district and five to ten person days of SEA time. In another state, when the SEA believed that the highest degree of accuracy had been achieved, the SEA agreed to generate and use only three reports for all SEA use, thereby reducing the frequency of LEA updates and edits for SEA reporting.

3. AD HOC REPORTING

In all states, officials reported an increased capacity to respond to ad hoc requests for information from legislators and other executive agencies, thereby improving the status, funding level, and other support from these groups for special education services. In one state, the MIS is increasingly being used to respond to state board requests; ten years ago, the state board refused to use the state's MIS data for any analysis or policy formulation. In two states, the MIS is used to respond to state legislative requests which, in both instances, has increased either the state FTE weighting or total amount of funding for special education.

4. PROVIDE SPECIAL REPORTS TO LEAs

In all study states, the state MIS data base has been used, to varying degrees, to provide LEAs with special reports. In two states, this was the major mission of the state MIS during early implementation. In two other states, the SEA prepared interim reports for final editing by LEAs before funding allocations were determined. In three of the states, the SEA provided reports on programs and services designed to help LEAs make self-assessments of their programs in comparison to similarly-situated districts elsewhere in the state.

5. IEP BENEFITS TO LEAs

In those state where IEP components were available through the state MIS or where districts implemented IEP programs as an adjunct to the state MIS, the following types of benefits were observed:

- increased teacher/student contact time in instructional and related activities, as time for routinized activities was reduced through the use of automated IEPs;
- increased teacher and IEP staff time to discuss substantive issues during IEP meetings with parents as a result of pre-printed IEPs available prior to and during IEP meetings;
- in those districts with high student transfer rates (i.e., intra- or inter-district), IEP documents facilitated student transfer between schools and reduced staff time for student processing;
- the use of IEP programs with extensive capabilities to monitor students' goals, objectives, enabling skills, and evaluation strategies facilitated the placement of students in appropriate activities and provided more substantive student progress monitoring;
- the use of IEP components (in addition to the general state MIS) justified increases in the amounts of state funding allocated to LEAs as a result of more accurate reporting on services rendered, particularly for high-cost special education students; and
- for private placement students, the automated IEP facilitated tracking multiple services provided by several agencies.

B. PLANNING AND IMPLEMENTATION VARIABLES

Across all states, a number of common planning and implementation variables were, to some degree, observed. Below we describe these general variables.

1. STATE FINANCIAL INCENTIVES

At one time or another during the implementation process in all states, the SEA provided financial and related incentives to LEAs to implement the MIS at the local level and to transmit accurate data to the state. In two states, LEAs were paid a specific amount for errorless individual student records; this strategy encouraged districts to use SEA-provided software and reporting forms. In one state, LEAs were provided small financial grants to implement the state MIS and IEP component at the district level, as well as to transmit data to the SEA electronically. In three other states, the SEA developed (or had contractors develop) the specific software and provided this software to LEAs at no cost. In two states, the SEA provided technical assistance to LEAs to develop software programs compatible with the MIS data base and/or to effectively use telecommunications/modem hook-ups for electronic transfer of data. While accurate, nonduplicative reporting of child count data was the

basis of state allocations of Federal funds to districts in four of the five states, accuracy of these data was also the basis of state FTE-weighted formula funding allocations to districts. Hence, in all states, funding was both a "carrot and stick", that provided critical incentives for the successful implementation of the state MIS.

2. STATE PRIORITY/MANDATE

In all five states, a high-level priority and/or legislative mandate was critical to the initial implementation of the state MIS. In three states, the SEA and/or Governor took a lead role in establishing the priority to ensure accurate, uniform, and timely reporting of special education information. In one of these states, the Governor's Office eventually had to take a lead role to foster coordination among various state agencies; in another of the states, the SEA -- in conjunction with three intermediate education units -- established a priority and provided the necessary financial and other resources for development, training, and LEA involvement, along with incentives to foster a "bottom-up" approach to implementation. In the other state, the SEA became frustrated with attempts to ensure interagency coordination and provided its own development and implementation resources, including mini-grants to districts for participation. In one of the remaining states, the legislature provided the initial mandate, while the SEA took the leadership role in merging the special education MIS with a larger state-wide MIS. The pilot implementation of the MIS in the remaining state was funded by the SEA in shared leadership with administrative planning units, which have taken a leadership role in pilot testing, development, and implementation of the new MIS.

Perhaps more important than the stated priority and mandate has been implementation "follow through". In all states, a small group of individuals, usually within the SEA Office of Special Education and/or state MIS office, has been responsible for maintaining the momentum, ironing out problems, and otherwise facilitating the expanded implementation of the MIS.

3. SEA INVOLVEMENT OF STAKEHOLDERS

Initial involvement of stakeholders, particularly LEAs and IEUs, in planning, design, and implementation of the MISs occurred in all five states. Obtaining uniform definitions for data collection and reporting is perhaps the major obstacle in implementing any state MIS. Virtually all of the states established councils, task forces, governance groups, etc. for the purposes of: (1) developing uniform definitions, terminology, and data dictionaries; (2) pilot testing these definitions; and (3) finally, through an iterative process, arriving at consensus over a one-to-three year time period. In two states, the SEA took a leadership role in obtaining consensus among LEAs, while initially dropping attempts to develop consensus relating to definitions among other state agencies. In two other states, where special education reporting systems are being merged into larger state-wide reporting activities, procedures for establishing uniform definitions have been established between the SEA, LEAs, and (at the LEA level) between special education and MIS staff.

In addition to stakeholder involvement in establishing common definitions in four of the five states, stakeholders were involved in designing the flow of information and reporting requirements addressing "who gets what information, for what decision-making process, and when". In the remaining state, a top-down approach using the "carrot and stick" of state FTE funding was a primary impetus. Not only did stakeholder involvement resolve many of the definitional problems, it also ensured that locals perceived a direct benefit and utility from using state MIS data; such involvement also provided stakeholders with an opportunity to "buy into" the overall system and develop ownership. This has been particularly true in three of the five study states.

4. STATE-LEVEL SPECIAL EDUCATION/MIS JOINT TECHNICAL DEVELOPMENT

To the extent technical software development was required among the states, the nature of development and who was involved appeared to be critical. In all instances, at least one individual with in-depth special education knowledge and experience and one individual experienced in designing MISs and/or software development were jointly involved throughout the initial design and development, as well as much of the pilot testing phases. In one

state, the software development was headed by a special educator and a software specialist at the SEA level; during subsequent field-testing, their counterparts in regional units were similarly involved in field-testing, training, and implementation. In another state, the SEA contracted for overall software development with a systems analyst who worked for a special education director who designed the state MIS and IEP component. In a third state, the SEA provided grants to a task force, which included a university-based software developer, special education administrators from three planning units, and a university-based trainer. In another state, the SEA contracted the initial development with a former SEA staff person; in mid-course, the SEA decided to conduct all development in-house for a radically revised system and, today, the system is being directed by an individual with a combination special education/software background. In the final case, the state funded the local district special education director to work with a very technically skilled systems analyst in the MIS development effort. This solution evolved after a number of software development consultants contracted to work on the MIS had come and gone. The current technical consultant has been with the project for eight years and is employed directly by the state department. Stability of project staff is a key factor in keeping MIS development on track.

The type of joint development described above assisted enormously in a number of ways. First, it enhanced the capability of the development team to communicate with both special education and MIS staff at the LEA level during the design, development, and pilot-testing phases. Second, it ensured some degree of stability in terms of staff turnover, which is often a critical problem with programming staff. And third, it fostered greater clarity and utility in definitions and data dictionary terminology.

5. LOCAL IMPLEMENTATION VARIABLES

In addition to critical SEA/LEA design and implementation variables, a number of patterns at the local level emerged from the study, as noted below.

a. Collaboration/Communication Between Special Education and the MIS

Virtually all of the LEAs who successfully implemented the MIS established procedures for collaboration and communications between the Special Education office and the district's MIS office. Common communication problems were definitions and terminology. Districts among the states used different approaches to facilitate communications and minimize such problems. For example, in one state, the district MIS directors attempted to develop customized reports to accommodate existing special education processes and reporting procedures used at that time within the districts. Hence, the automated MIS reporting system was as transparent as possible and nonduplicative to the previously followed manual processes. In another state, the key individual in the intermediate education unit served initially as a facilitator between special education and MIS staff. In another district, the superintendent -- who had a background as a systems analyst -- established a process whereby he personally served as a "referee" on definitions and other issues between the MIS and special education staff. In most local sites, however, a collaborative effort based on mutual trust evolved, contributing to successful implementation and, in several instances, increased state special education funding to the district as a result of improved reporting accuracy. In all sites, at least one individual played the critical role of technology advocate.

b. Quality Control over Data Entry

In all LEAs, quality control over data entry has been a major concern. Virtually all sites took a variety of measures to ensure accuracy and minimize duplicative staff time for data entry and processing. Most sites assigned responsibility for data entry to data entry specialists in individual schools or data entry staff in the central office to whom teachers and supervisors sent forms and student records for data entry. In most instances, edits were sent to IEUs and SEAs for preliminary review to ensure that all data related to funding allocations were accurate and that child counts were nonduplicative. In most LEAs, the official data on student records was included only on one form, which had to be processed by a single authorized individual. In addition to local initiatives to ensure quality control, several SEAs provided incentives. In addition to financial incentives for

accurate student records, SEA and other officials in three states provided technical assistance, software development, and other resources to LEAs to encourage them to use the state MIS student data base to generate reports for local decision making, under the assumption that if the data were used for local purposes, it would be more accurate.

IV. IMPLICATIONS FOR POLICY MAKERS

As indicated in our discussions of the individual special education management information systems and our cross-site comparative analysis, there are a number of important lessons learned by the states and LEAs included in our study sample as they developed and implemented their systems.

In order to set the stage for a discussion of the issues pertinent to the planning, designing, and development of an MIS, there are a series of sequential steps that must be acknowledged. These are not necessarily presented in sequential order; however, the first four or five steps should initiate the process. The steps include:

- a. establish a mandate to implement an MIS -- either legislatively or departmentally;
- b. identify stakeholders who should be involved in the MIS planning, designing, and implementation processes;
- c. gain consensus on definitional issues from stakeholders;
- d. develop a plan with stakeholders;
- e. develop the management information system;
- f. pilot test the MIS:
 - evaluate effect of MIS; and
 - refine MIS;
- g. offer training in the MIS; and
- h. offer resources/support to local districts for full state-wide (district-wide) implementation.

To express the most important study findings in a manner useful to state and local policy makers, we have formulated a series of questions relating to each of the steps highlighted above. These questions are intended to highlight the types of inquiries which might typically be made by policy makers seeking to design and implement a special education MIS in their state.

A. ESTABLISHMENT OF MANDATE FOR MIS

QUESTION: What type of mandate should be used to initiate a state-wide MIS for special education?

The nature and extent of the mandate is likely to be related to a state's tradition of SEA/LEA relations (i.e., centralization versus local autonomy). Within most states, traditional special education SEA/LEA relations are generally more centralized than in other categorical programs such as Chapter 1, vocational education, etc.

The source of the priority or mandate could also influence the goals, design, and implementation of the MIS. For example, as our study found, if the source of the mandate is primarily the state legislature, major issues (or constraints) will relate to accuracy of reporting (particularly for projecting and allocating state funds) and the benefits of the program, as well as reduction of paper work and reporting requirements at the local level. When the source of the mandate is the Governor's Office, special attempts will be made to minimize duplication of data collection and reporting among participating state agencies. If the source of the mandate is from the SEA Office of Special Education, the design will tend to be more clearly focused, with a primary intent to meet Federal reporting requirements, while at the same time encouraging districts to use the state MIS data for local management, planning, and related purposes.

QUESTION: What will be the primary objectives of the MIS?

The type of mandate and the state context in which it is formulated will also affect the MIS's objectives. Beyond the basic objective of being able to generate required Federal and state reports, the SEAs in the study placed varying priorities on the following objectives:

- to provide accurate information for determining state allocations to districts for special education funding;
- to increase accuracy of student and program data, particularly minimizing unintended, duplicative counts;

- to reduce staff time at both state and local levels for entering, verifying, and generating data in required formats for state-level reporting;
- to assist SEA staff in preparing for on-site monitoring visits through desk audits;
- to help local special education staff improve the quality of decision making and program planning through the use of the state MIS data base; and
- to generate special reports for local districts, using the data base, and to analyze programs across sites for program improvement purposes.

Placing priorities on each of these objectives involves trade-off considerations relating to MIS design, stages of implementation, incentives provided for stakeholders, and resources to be allocated at the state and local levels.

QUESTION: What types of incentives can be used to facilitate implementation?

The type of mandate can also affect the flexibility to provide appropriate incentives for intermediate and local agencies to facilitate effective MIS implementation. For example, in one study state, the legislature mandated the MIS but delegated planning responsibility to a special council. The council determined that the envisioned MIS must execute on existing hardware at both the district and intermediate unit levels, thus reducing initial hardware costs to locals. State-level task forces in two states established a virtual moratorium on ad hoc data collection from LEAs beyond that specified for the MIS. This lent credibility to the mandate and reduced, in many cases, duplicative local data collection. In one state, where the SEA established the mandate, a variety of financial incentives to intermediate data processing groups and local districts were provided for errorless reporting. In four of the five states where the SEA was a primary source of the mandate, the SEA provided direct incentives to LEAs to address specific problem areas. These included: (1) providing technical and software development support to help local users tap into the MIS data base for decision-making purposes, thereby increasing the incentives for accurate data; and (2) providing software to districts to alleviate compatibility problems among various types of hardware and to encourage LEAs to transmit data electronically to the SEA.

B. STAKEHOLDER INVOLVEMENT IN PLANNING AND IMPLEMENTATION

QUESTION: What individuals and agencies, at what levels, are essential to successful implementation of a state-wide special education MIS?

The specific staff who should be involved as stakeholders depends on a number of factors, including:

- the comprehensive nature of the MIS (e.g., whether it will be dedicated to special education or merged with an overall state-wide MIS);
- the priority objectives of the MIS (e.g., for meeting minimal Federal and state reporting requirements or for use at the local level for decision making and planning);
- the environment in which the MIS is to be developed (e.g., the level of knowledge, expertise of staff, the efficacy of existing manual procedures at the state and local level);
- the nature of hardware and related resources available to implement the MIS (e.g., whether hardware will be dedicated or shared at local and state levels); and
- the stage and purpose of stakeholder involvement (e.g., early involvement in design and policy formulation or later involvement in field-testing and refinement).

In each of the study states, key individuals from the state Office of Special Education and the state MIS Office (or Data Processing Office) were involved during planning and design phases. In most instances, these individuals served as liaisons to staff in the other offices who represented additional SEA stakeholders. In some states, a team of special education officials and a counterpart team from MIS constituted a planning task force or committee.

In virtually all of the local districts involved in the study, representatives from special education and MIS (where such offices existed) were involved in planning and initial pilot testing. In larger districts, individuals to be responsible for subsequent data entry were also involved. During initial SEA/LEA policy planning meetings, the local Directors of Special Education and MIS Offices were also frequently involved as stakeholders.

In those states where intermediate education units played an important data processing function, teams involving special education staff and MIS/software development staff were involved in the planning and design process. Involvement of special education and technical staff at all levels was found to be critical in order to facilitate communications, to develop usable definitions, and to ensure stability, particularly as technical staff turned over.

QUESTION: What processes are successful in getting individuals and agencies invested in the MIS design and implementation?

Across all states, a key special education SEA official and/or team attempted to determine the vested interests of the various stakeholders in the MIS. In two of the states, where attempts were initially made to design the MIS for use by other state agencies, a number of agency vested interests were identified as:

- the need to access accurate data for state agency-specific reports;
- the need to justify funding and/or payments to local and other agencies for services rendered for the state agency;
- the need to track individual students/clients as they transfer from one placement/agency to another for specific services; and
- the need to monitor key provisions and interagency coordination agreements.

In only one of these two states did other agency use of the state MIS evolve. Critical to this evolution was the recognition that substantive procedures had to be clarified -- particularly relating to who pays for various services -- before the participating state agencies decided to access data from the MIS.

In designing the state MIS and developing a pilot test/implementation plan, SEA officials took into account many of the following LEA vested interests:

- the potential capacity, through the use of MIS data and IEP components, to maximize the amount of Federal and state funding which the district could receive (or, at the least, minimize losses due to inaccurate reporting and/or duplicative counts);
- the perceived need to reduce duplicative local data collection and associated paper work;

- the use of the state MIS reporting system and data base for local decision making and general program management;
- the need to provide audit trails for students who receive services from multiple funding sources;
- the opportunity for intermediate education units to provide data processing services under contract to the SEA and districts;
- opportunities for LEAs to participate in field-tests and the design of the state MIS to ensure that it accommodates the LEA's needs to the extent possible; and
- the need to increase special education administrative staff and budget as a precondition for implementing the MIS at the local level.

Although the process for involving stakeholders differed from state to state, some patterns emerged from the study.

Most SEA officials and policy makers attempted to build upon the strengths of the existing resources and infrastructure to implement the MIS. In one state, an existing telecommunications network with existing hardware was relied on. In another state, the regional intermediate unit structure was delegated primary data processing responsibility.

Three of the five states relied on an existing committee involved in general education data collection and reporting to formulate policy for the state's special education MIS design and implementation. In two states, new task forces were created specifically for the special education MIS effort. Virtually all states facilitated local use of existing hardware by providing technical assistance and software to reduce compatibility problems.

All states used formal or informal ad hoc working groups for detailed planning, pilot testing, and implementation. Membership not only represented a balance between technical and special education knowledge and experience, but also took into account many of the following considerations: (1) the individual was recognized as a key influence maker among peers throughout the state; (2) the individual would be able to attend all meetings and work actively as part of the team; and (3) the individual would be available to participate in pilot testing and subsequent implementation beyond the design phase.

In a number of states, in addition to formal groups involving stakeholders, other initiatives were undertaken to identify stakeholders' needs and develop stakeholder ownership.

- In one state the SEA commissioned an independent consulting firm to conduct a user needs survey among all LEAs and to report findings along with current attitudes and suggestions for improving local use of the MIS data base.
- In one state the SEA adopted a locally developed MIS/IEP software program for recommended use and provided grants to LEAs for its purchase.
- In several states, the state MIS Office obtained local approval of forms, definitions, and reporting formats before the MIS design was finalized.
- In four of the five states, different components of the MIS (including training components) were pilot tested under a staged implementation plan in many districts and planning units to maximize the number of potential users involved in pilot testing.

C. DEFINITIONAL CONSENSUS

QUESTION: What are the minimum components of an MIS for special education?

To identify the minimum components of a state MIS for special education, it is first and foremost necessary to examine the goals of the MIS.

Initially across all states involved in the study, the minimum goal of the MIS was to collect from all local districts, cooperatives, and/or intermediate units sufficient data to satisfy state and Federal reporting requirements. Of course, this reporting requirement reflected the deadline of child counts to Federal officials by December 1. Gradually, this goal broadened to include data requirements for state and local decision making. Such a decision support system had three major reporting functions:

- data for state and Federal funding and analysis;
- support for ad hoc analyses, including legislative and funding issues (perhaps even program evaluation); and
- decision making for planning and future requirements of service delivery to the special education population.

Several states had existing manual systems that provided information addressing these goals at various levels; however, they wanted more from their existing systems. State and local officials wanted:

- increased accuracy of reporting (child count data on which to base the FTE);
- reduced data entry time and fewer errors through standardization of formats, systems, and definitions; and
- more uniform and consistent implementation of special education and related services across the state and within local districts and intermediate units.

QUESTION: What are the data elements what are considered essential by each of the participants?

Once minimum goals had been articulated and agreed upon across members of the state and local planning committees, it was essential to identify specific data elements that could provide the summary statistics required of reports for child count. One of the major problems associated with the design and implementation of a state-wide MIS for special education initially was the lack of standard definitions, terminology, and data formats.

The following are examples of the type of data that were considered essential to be included in the MIS development initiative:

- Student Data: name, unique identifier, social security number, birth date, sex, ethnicity, primary language, educational legal residence, attendance LEA, building code, grade level, entry status, annual status, exit status, Federal funding source, education decision maker, comprehensive evaluation date, latest IEP review date, placement date, exit date, anticipated services, primary exceptionality, delivery model (minutes, days, weeks, teacher ID), secondary services (minutes, days, weeks, teacher ID), related services, referral, assessment dates, and parent/legal guardian.
- Personnel Data: staff data, position data, and salary data.

Definitional issues arise at two distinct levels: (1) between content and technical areas (special education versus computer programming and hardware); and (2) among reporting units (LEAs, intermediate units, and cooperatives) within a given state. Application of technology to special education reporting requires, at a minimum, two types of expertise: (1) technical

computer programming; and (2) special education content knowledge. It is, therefore, important to involve individuals that represent both types of expertise.

QUESTION: What methods are most useful for gaining definitional consensus across stakeholders?

In order to ensure that the resulting data elements and their definitions reflect the requirements of the many types of professionals who will be involved in the MIS implementation, it is essential to include professionals who represent a variety of different fields, including technical, educational, legal, administrative, etc.

All states issued manuals that explained the codes and formats to be used in recording data for the MIS. A standard set of forms that were to be completed manually included specific fields assigned to each data element. Defining each field with an acceptable range of response choices also assisted in standardizing reporting.

D. MIS PLANNING

QUESTION: What are effective methods for involving stakeholders in the planning process?

As with all other stages of MIS development, involvement of stakeholders in the planning process will almost certainly lead to a more effective and practical special education MIS. This involvement can be achieved in a number of ways, many of which require little or no additional cost on the part of the state. Among these are:

1. All potential stakeholders should be contacted at the inception of the MIS effort and should be assured that their participation in the development and implementation of the system will be ongoing. Local educators know the difference between continuing substantive consultation and a one-time superficial meeting.
2. As a corollary to this, it should be emphasized to all stakeholders that their participation is crucial to successful MIS implementation. If this committed involvement is to be maintained, regular correspondence (e.g., a monthly progress report) with stakeholders should occur and vocal attribution should be given to stakeholders who have made extraordinary contributions.

3. Stakeholders should be made aware, at the outset, of the financial responsibilities of all parties and, in particular, of the resources they will be expected to contribute to the MIS effort. Moreover, they should be informed about the financial and other incentives that will be provided for active participation.
4. At the beginning of the planning process, stakeholders should be made aware of the expected benefits of the MIS to them. While acknowledging that convenient and uniform state reporting is a primary MIS objective, the state should stress the benefits offered by the system for local and state management decision making.

QUESTION: How long does it take to get all stakeholders to commit to the development of a plan?

The amount of time needed to develop a plan acceptable to all (or nearly all) stakeholders can, of course, vary greatly from state to state, depending on the state's political, economic, and administrative climates and the number of stakeholders involved. However, the time can be minimized if a number of simple steps are undertaken:

- Consult with stakeholders only after the MIS mandate has been affirmed and the concept for the MIS is clear. Premature stakeholder involvement could lead to a prolonged lobbying effort by vested interests.
- Prepare well for initial stakeholder contacts. Even a strong MIS concept can be undermined if stakeholders perceive the approach to be incoherent.
- Follow-up on initial contacts promptly. By following-up initial contacts with stakeholders after a short time (perhaps a week), the state can:
 - obtain early commitments from supportive stakeholders;
 - identify and address unanswered questions or problem areas before they fester;
 - identify individual stakeholders who might undermine system development, attempt to address their concerns, and determine the scope of their influence; and
 - define, early in the planning process, areas where changes must be made.

It should be recognized that, in any state, it will be difficult to obtain unanimous agreement. There will always be chronic dissenters, as well as conscientious stakeholders with valid disagreements about the MIS. However, if these and other strategies for early and straightforward stakeholder

involvement are employed, a strong consensus for the MIS can be developed in a matter of months.

QUESTION: What are the major potential roadblocks to progress and how can they be resolved.

Because of each state's uniqueness -- politically and administratively -- the range of problems that might arise in the planning process is nearly limitless. Many of these roadblocks and solutions have been addressed above. To deal effectively with problems that may arise during planning and development, it is important to adhere to the apparently conflicting goals of following the plan and remaining flexible. This can be accomplished by viewing the initial plan as a general guideline that becomes firmer over time as problems and roadblocks are resolved.

Among the types of problems that might be encountered during the planning and development processes are turnover and stakeholder disenchantment.

Staff turnover, in particular, can cause critical discontinuities if not well planned for. A change in state leadership could have an impact on the nature and strength of the mandate for the MIS. It is, therefore, critical that MIS planners keep in contact with the source(s) of the mandate and reaffirm it if key legislators or agency officials are replaced. Similarly, turnover among the MIS planning and development staff can have devastating effects if not properly anticipated. Continual updating of the plan and detailed documentation of development activities are necessary if the impact of staff turnover is to be minimized. At the local level, turnover among district stakeholders can affect cooperation and participation. Such local turnover should be monitored and, as necessary, new individual stakeholder should be briefed and brought into the fold.

A problem that could occur in any state, despite the most careful planning, is a single (or small number of) especially vocal dissenters. System planners must be sensitive to such stakeholders and should develop tactics for diffusing their influence. Maintaining flexibility in the MIS will allow MIS planners and developers to make small adjustments in the system that could

satisfy the egos of such dissenters, thus disarming their protests without significant impact on the MIS.

As described above, conflicts among state agencies with regard to MIS definitions or objectives must be resolved prior to development. Such resolution will necessarily involve compromise by all parties that can be achieved only by an active and continuing interchange of ideas. Such disputes should not be permitted to linger, but should be resolved as quickly as possible through as intensive negotiations as become necessary.

E. MIS DEVELOPMENT

QUESTION: What are the essential steps in achieving the goal of a testable MIS?

The process called for by the development of a state-wide, special education MIS is not markedly different from that of other system development efforts. Because of the number and range of stakeholders in the special education MIS, greater attention must be paid to political and administrative considerations. The basic steps, many of which are addressed elsewhere in this section, include:

- clarifying the stated objectives of the MIS;
- identifying and defining the data elements to be incorporated into the system;
- determining the nature of the reports the MIS will produce;
- determining a realistic schedule for system design, development, testing, and refinement;
- selecting qualified staff, consultants, and/or contractors to conduct the development; and
- identifying state and local agencies who will be eventual users of the MIS to serve as test sites and general sounding boards for the system.

QUESTION: Who should work on the development team?

Decisions about the individuals -- and the qualifications of those individuals -- who will serve on the MIS development team are critical to the success of the system. As has been emphasized elsewhere in this report, the development team must include individuals with expertise in special education, as well as technical specialists with experience in the design and implementation of large information systems. Representatives from all system stakeholders should have input into the identification and selection of development team members.

Each state should understand the range of development resources it has available to it. Such staff resources might include:

- state office of special education staff;
- state data processing office staff;
- staff from other state offices that have appropriate MIS experience;
- staff at colleges and universities;
- private consultants; and
- private firms and nonprofit organizations with appropriate capabilities.

While a range of individuals may be drawn upon for MIS development, it should be remembered that the lead agency (probably the state MIS or special education office) will have primary responsibility for the system. This agency must designate the most qualified individual to: (1) provide leadership to the effort; (2) maintain the development teams' focus on the MIS's objectives;; (3) assess the progress of system development; and (4) make final decisions when disputes arise.

It is crucial that all participants in MIS development maintain objectivity about their capabilities. It would not be unusual for state data processing staff to believe that they should be given development authority when, in fact, MIS development might be conducted more quickly and less expensively by consultants or contractors. Individual or collective egos must be subjugated to the benefit of the system.

QUESTION: What are some of the common mistakes that are made during the development process?

Although a broad range of common mistakes are cited by study states, a number of important ones bear emphasis.

First and foremost is the common tendency on the part of system developers to place great weight on the technical elegance of the system, forgetting that providing data for reporting and decision making is the system's objective. Indeed, if an effective manual MIS is in place, the new automated system should be designed to maintain, to the extent possible, the existing interfaces with users. The system itself should, where possible, be transparent to those called upon to provide MIS data or use MIS outputs.

Another mistake to be avoided is the tendency to try to use the most up-to-date hardware and software in order to achieve maximum system efficiency. While efficiency is, of course, important, system developers must remember that local schools will not, in every case, have the current hardware and software needed to participate in the MIS. Unless the state is prepared to provide LEAs with considerable financial support in this area, system developers must achieve a balance between efficiency and the availability of compatible systems locally.

Often, special education staff will see their data requirements as being unique and, consequently, will ignore existing or planned MIS in other related state agencies (e.g., human services, general education). The experiences of our study participants suggest that, even when an independent special education MIS is to be developed, the potential exists -- perhaps in only a few years -- for incorporation or merger with other state systems. The far-sightedness to look at other systems and incorporate useful components into the special education MIS can yield valuable future savings in time and resources if such a merger occurs.

F. MIS PILOT TESTING

QUESTION: What are the criteria that have been established for determining effectiveness of the MIS?

Can the pilot MIS meet the goals of the MIS? Given that the ultimate goal is to provide a system that can be used by all districts and intermediate units in a state, system requirements must be designed to support a variety of planning activities and services. Some of these include report functions, information analysis, projecting future needs, and ad hoc analyses, among others.

Such system requirements include: referral log, maintenance of student data, generation of class lists, assignment and monitoring of psychologist case loads, analysis of referral data, printing of mailing lists, teacher licensing data, and staff salary information. The system should provide for the collection, editing, and reporting of data used to determine FTE reimbursement.

QUESTION: How many pilot sites should be involved in the test?

Selection of pilot test sites should give priority to those local districts and planning units that indicate a desire to be involved in the pilot. This investment in the effort will ensure that the pilot test of the system not only provides an indication of areas where problems exist, but sites will offer solutions to these problems.

A staged implementation of MIS components has proven to be a successful way to test the MIS in its beginning stages. Implementing a pilot test of several components of the MIS in each volunteer local district or planning units offers the opportunity to use an iterative process of test-refine-test again. This strategy helps isolate the particular MIS component in which problems exist. In this way, when the entire system is pilot tested, it is more likely to run smoothly.

QUESTION: What site characteristics should be represented across the sites involved in the pilot test of the MIS?

One of the key issues in selecting districts to participate in the pilot test of the MIS relates to the type of hardware and software that is already installed in the administrative offices and school buildings. This is critical to accurate testing of the MIS and debugging software programs that are in their developmental stages.

Demographic information about the districts is important from the standpoint that it helps tailor future training to districts with similar background variables after the MIS has been finalized. However, the most important variable for the selection of pilot sites is the local desire to be involved in the testing and refining of the MIS.

Interpersonal relationships between the MIS Office and the Office of Special Education are critical, as are relationships among the special education administrative director, staff, and practitioners in the classrooms. It is important to have some knowledge of the local pilot sites in order to understand their results and reactions to MIS pilot testing. Key information includes: (1) the extent of local experience with computers; (2) the length of time they have used software similar to the MIS being tested; (3) the location of the work stations (in staff offices, computer room, or secretarial area); and (4) the computer skills of district personnel involved with data entry.

QUESTION: What incentives are most effective in securing cooperation and support from local districts?

Since one of the critical variables in selecting pilot districts is their desire to be involved, the primary incentive for them is that they will have input into the design and implementation of the final version of the state-wide MIS. In these cases, the local districts understand the benefits that can accrue specifically to them. Understanding the importance of the availability of data for the local decision maker is an important impetus for participation in the pilot test. Often this is the most significant and only incentive required to securing cooperation and support for the pilot test.

QUESTION: How can quality of data be ensured? What procedures are effective?

Often financial incentives or disincentives have been used to affect the quality of the data submitted by the local districts and IEUs. Both of these have been effective in influencing the quality of data submitted.

Ensuring that reporting formats are standard, definitions are consistent, and MIS training is available are additional strategies that influence district ability to provide quality data.

Thoroughly editing the MIS handbook that contains definitions and terminology is one goal that can assist in ensuring quality data and reporting. Testing the system to be sure that there are methods for handling "unusual" cases in a consistent manner is another way to ensure that the system can accommodate variability.

Often the importance of an existing manual system that is accurate, consistent, and reliable is overlooked. Automation does not ensure that a poorly designed or poorly implemented manual system will be accurate, consistent, and reliable. Automation of such a manual system has the potential to increase errors and limit accuracy.

QUESTION: What suggestions should be incorporated in the refinement of the MIS?

Improvements that involve time savings, support consistency of reporting, and include incentives for using data in meaningful ways at the local level should be incorporated into refinement of the MIS.

G. MIS TRAINING

QUESTION: What existing training networks are appropriate for supporting MIS training?

When states already have an existing state-wide MIS and it is expanded to include the special education requirements, there should be a number of district personnel who have knowledge of the implementation and use of the

MIS. Once these individuals have training in the specifics of special education requirements, they can be used as a cadre of experienced trainers.

In cases where the MIS is developed jointly with a university department, there may be individuals at the university who can serve as trainers. In addition, district personnel in the pilot sites offer special expertise based upon their experiences with the MIS. Their skills can be tapped in providing training to districts new to the MIS.

QUESTION: What resources are available to support local MIS training?

There are a number of costs associated with local implementation of an MIS. Often the issue of acquiring additional staff arises. In such cases the question of department assignment for these additional personnel becomes a focal point for budget justification. The fact that MIS personnel generally require and receive higher salaries than comparably experienced educators is important to acknowledge.

Determining what kind of skills and experience are actually important to the successful implementation of the MIS is critical in recruitment and employment of new staff.

Training of local special education administrators and practitioners has, in the past, been funded with Federal allocations. These funds are, for the most part, no longer available.

Funds for purchasing software and hardware are often provided by the state department in order to induce local districts and intermediate units to come "on board" with the system. When software and hardware specifications for the state-wide MIS are very explicit, the state often gives the districts the special software required to transmit data to the state. One state funded the development of software that would ensure compatibility of data transmission across all existing hardware platforms and then provided the software to each district.

It is important for local practitioners to have hands-on training if they are to become proficient in meeting the data entry requirements of the MIS; this

training represents an additional cost for the district. Summer workshops are often preferred for this type of training because release time of teachers from class is not required.

An important issue related to hands-on training is the availability of hardware and software that will be used with the MIS. Training should be provided shortly before or immediately after the installation of the hardware. Any significant time span between hands-on training and actual use of the hardware decreases the effectiveness of training and transference of newly learned skills. This is particularly true for users new to technology.

H. MIS RESOURCES

QUESTION: What level of state resources and support are necessary for state-wide MIS implementation?

In the study states, the most critical state resources for MIS implementation were key individuals within the special education and MIS offices who were knowledgeable about special education and had appropriate technical expertise in software design or MIS reporting. These individuals were usually given the primary responsibility for design and implementation of the MIS.

In most of the study states, the SEA either had data processing capabilities available or could rely on intermediate education units for data processing and reporting to the SEA. At least two types of support from the SEA were common across the states, including:

- software development and subsequent training to intermediate units and LEAs relating to the special education MIS software; and
- technical support to intermediate units and LEAs to assist them in developing/modifying software to use MIS data for local decision-making purposes.

QUESTION: What resources are required at the local level for implementation?

At the local level, the most important resource was staff, either staff re-assigned specifically for local MIS implementation or additional staff time which was made available to participate in training and other implementation

activities. Successful districts usually assigned a team of two or more individuals with a combination of special education and technical knowledge to supervise training and provide liaison. In most study districts, acquisition of new hardware and software was not a great financial burden because:

- in one state, the state mandate required that the MIS operate on hardware currently available at the district level;
- in the other states, district staff used existing equipment (or IEU equipment) for data processing and generating reports; and
- in most states, districts were given MIS software at no cost or were provided special grants for the purchase of the software.

QUESTION: How long should the implementation process take?

The implementation process within a state depends upon a number of factors, including:

- the level of priority placed upon the mandate;
- the degree to which the implementation plan is tied to the allocation of state funding to the districts; and
- the number and demographic characteristics of districts and intermediate units within the state.

In three of the study states, the implementation process took more than eight years; in two of the states, full-scale implementation will have taken between three and five years; In the latter two states, where more recent implementation has occurred, several factors contributed to the shorter process, including: (1) a staged implementation strategy with high stakeholder involvement; (2) a combination of grants and financial incentives to ensure local implementation and electronic transmission of data; and (3) advances in software which reduced software compatibility problems.

QUESTION: Should hardware and software requirements be mandated or should local districts have options?

If local districts are provided the option to use different types of hardware which meet certain minimal requirements, the state or a delegated agency must ensure that compatibility problems are resolved early in the implementation

process. This, in fact, occurred in one state. If the state allows the use of various hardware (with a standard operating system), the SEA should be responsible for providing software support and applications software to facilitate uniform reporting. This occurred in three of the states. Over time, in all of the states, advances in systems and application software tended to reduce compatibility problems, particularly those related to electronic transmission of data to the SEA.